CONFIDENTIAL

STATE OF SOUTH DAKOTA

PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE PETITION OF BERESFORD MUNICIPAL TELEPHONE COMPANY FOR ARBITRATION PURSUANT TO THE TELECOMMUNICATIONS ACT OF 1996 TO RESOLVE ISSUES RELATED TO THE INTERCONNECTION AGREEMENT WITH ALLTEL, INC.	Docket No. TC07-113 **DIRECT TESTIMONY** **OF** **NATHAN A. WEBER**

DIRECT TESTIMONY OF NATHAN WEBER
ON BEHALF OF
BERESFORD MUNICIPAL TELEPHONE COMPANY

Q1. Please state your name, employer, business address and telephone number.

A1. My name is Nathan Weber. I am the Director of Engineering of Vantage Point Solutions, Inc. ("Vantage Point"). My business address is 2211 North Minnesota Street, Mitchell, South Dakota, 57301.

Q2. On whose behalf are you testifying?

A2. I am testifying on behalf of Beresford Municipal Telephone Company ("Beresford"). Based on my experience working with Beresford for over 5 years, I know that Beresford provides local telephone exchange service and exchange access services in South Dakota and is engaged in the provision of general telecommunications services in the State of South Dakota subject to the jurisdiction of the South Dakota Public Utilities Commission ("Commission").

Q3. Generally, what types of services does Vantage Point perform?

A3. Vantage Point is a telecommunications engineering and consulting company whose services include long range communication plans and feasibility studies, emerging technology analysis and migration studies, telecommunications electronic equipment engineering, outside plant engineering, field services engineering and regulatory consulting.

Q4. What are your duties and responsibilities at Vantage Point?

A4. I am responsible for providing consulting and engineering services to clients in a wide array of technical and regulatory areas associated with telecommunications. Our client base consists of small Independent Telephone Companies such as Beresford. Vantage Point has more than 80 fulltime employees on staff. I am also responsible for the normal duties you would expect from the director of engineering for a company of our size.

Q5. What is your educational background?

A5. I have a Bachelor of Science in Electrical Engineering from South Dakota State University in Brookings, South Dakota.

Q6. Do you hold any professional engineering licenses?

A6. Yes. I am a licensed professional engineer in North Dakota and South Dakota. I am also a member of the National Council of Examiners for Engineering and Surveying (NCEES).

Q7. Do you have a resume of your experience?

A7. Yes, it is attached to my testimony as Exhibit NW-D-1.

Q8. What is the purpose of your direct testimony?

A8. The purpose of my direct testimony is to provide technical facts relating to the Arbitration[1] between Beresford and Alltel Communications, Inc. (Alltel). I will provide information relating to Issue 1 identified in the Petition for Arbitration for Beresford (referred to herein as the "Petition"). This issue was presented in the Petitions as follows: "Is the reciprocal compensation rate for IntraMTA Traffic proposed by Telco appropriate pursuant to 47 U.S.C. § 252(d)(2)?" Specifically, I will explain the engineering inputs and how they comply with FCC rule 51.505(b)(1).

Q9. Can you provide a general overview of the engineering inputs provided for the Forward-Looking Economic Cost (FLEC) model?

A9. The engineering inputs associated with the Beresford FLEC model consist of several components. First, the "Switching" network includes items associated with the deployment of a typical Class 4/5 voice switch. The individual components that were included in the FLEC engineering design for the switching network are separated into four main categories including Common, Line Cards, Line Interface Cards, and Trunk Cards. The "Inter-Exchange Transport" cost estimates associated with the Beresford FLEC study included Inter-Exchange Transport electronics and Outside Plant (OSP) cable necessary to connect to their Access Tandem provider, SDN Communications. The Inter-Exchange Transport cost estimates were divided into three main categories including Base Costs, Line

[1] In The Matter of the Petition Of Beresford Municipal Telephone Company for Arbitration Pursuant to the Telecommunications Act Of 1996 To Resolve Issues Related to The Interconnection Agreement With Alltel, Inc. (referred to herein as the "Petition").

Costs, and Tributary Costs. Similarly, the OSP cable construction cost estimates were included for "Town" construction only.

Q10. What voice switching technology and architecture was assumed in the development of the FLEC capital investment estimates?

A10. For the purposes of the FLEC engineering model for Beresford, it was assumed that they would deploy "Softswitching" technology within their network. The Softswitching technology is a packet, voice switching technology. This type of switch will allow for either Time Division Multiplexing (TDM) interfaces or packet interfaces to be deployed. The Softswitch uses packet technology for switching voice traffic, but this technology allows for either packet or TDM circuit connections to be used for line or trunk interfaces.

The Softswitch architecture, as commonly implemented in the industry and in the Beresford FLEC engineering model, consists of four components including the Call Agent, Signaling Gateway, Media Gateway, and Outboard Line Bays (OLB's). The function of a Call Agent is to provide services such as media and signaling gateway control and billing, call routing logic, Communications Assistance for Law Enforcement Act (CALEA) support, and miscellaneous subscriber services such as call waiting, distinctive ringing, and off-premise extensions. The Signaling Gateway's function is to provide the Signaling System 7 (SS7) signaling interface for the Softswitch. In addition, the Media Gateway provides media (voice) switching and processing capabilities. A diagram depicting this architecture is attached to my testimony as Exhibit NW-D-2.

The OLB equipment is used to provide analog plain old telephone service (POTS) line interfaces to the end subscribers. In a legacy digital switching architecture, the analog POTS lines were typically equipped in separate equipment bays, and the switch processors communicated with the analog POTS line cards via inter-bay interfaces and cables. One attribute of Softswitching platforms that is unique when compared to legacy digital switching architectures is the absence of on-board analog POTS line cards within the Media Gateway chassis. For Softswitch deployments, it is typically necessary to use devices such as OLB terminals, which are sometimes referred to as Digital Loop Carriers (DLC's), to provide analog POTS line card interfaces to serve the subscribers. For the Beresford FLEC engineering design, OLB's were assumed to provide this functionality. Like other Softswitching networks, the OLB's assumed in the Beresford FLEC engineering design function as virtual extensions of the Class 5 switch.

A single Media Gateway with a Signaling Gateway is included at Beresford. For new switching network deployments, this architecture is commonly deployed by telecommunications service providers whose number of subscribers and scope of services offered are comparable to Beresford.

Q11. Can you explain the design parameters were considered when developing the switching network architecture for the FLEC model?

A11. The FLEC engineering design for Beresford was developed to provide an efficient voice switching network that offers the appropriate grade of service for the subscribers of Beresford. The ability to provide voice services with 99.999% availability is paramount to telecommunications service providers such as Beresford. One key attribute that is included in the design is emergency stand-alone capabilities for the Beresford exchange This emergency stand-alone functionality offers the ability for subscribers to make local calls in the event that the communication path to the Call Agent is severed.

In addition, the switching network is designed to adhere to the South Dakota service standards for telecommunications companies set forth in the Administrative Rules of South Dakota. Specifically, the switching system was assumed to include custom calling feature such as call waiting, call forwarding, abbreviated dialing, caller identification, and three-way calling as set forth in A.R.S.D. Section 20:10:33:04. Similarly, the switching network is designed to adhere to A.R.S.D. Section 20:10:33:05 which states that during any busy hour, the telecommunications service provider network must allow for a minimum of 98 percent of call attempts to receive dial tone within three (3) seconds, a minimum of 98 percent of properly dialed calls for extended service area to be properly terminated, and a minimum of 98 percent of properly dialed calls routed entirely over the network of the local exchange carrier to be properly terminated.

Other required functions included in the FLEC engineering design for the switching network include E-911 service support, as well as CALEA support. In addition, the switching network architecture for the Beresford FLEC engineering design included SS7 signaling capabilities.

Q12. In your expert opinion, is the technology and architecture used for the FLEC model considered to be an economical, long-term solution?

A12. Yes. As stated previously, the distributed Softswitching architecture assumed for the Beresford FLEC model is a commonly deployed model for new switching network implementations. One primary reason that this architecture is commonly deployed in this market space is due to the fact that it is a robust and cost-effective solution for telecommunications service providers.

Q13. With regards to the engineering design for the "Switching" network for Beresford, what components comprise the various categories (*e.g.* Common, Line Cards, Line Interface Cards, and Trunk Cards) for the FLEC capital investment estimates?

A13. The Switching network investments for Beresford are separated into four (4) primary categories including "Common", "Line Cards", "Line Interface Cards", and "Trunk Cards." First, the category of Common items includes components that are common to the system. This category of network investment does not include any voice circuit interface cards that are active in the proposed system. The items included in the "Common" investment category include, but are not limited to, the following: Call Agent hardware, Call Agent software, Media Gateway chassis (including redundant central processing units, power supplies, and cooling fans), Media Gateway software, Signaling Gateway hardware, EMS and Web Provisioning systems, feature right-to-use fees (e.g. CALEA, Centrex, Web Provisioning, Emergency Stand-Alone, and concurrent call license), Ethernet interface, OLB chassis, OLB processors, OLB administration interface, and spare circuit cards. A diagram depicting the allocation of the switching network components to the respective categories is attached to my testimony as Exhibit NW-D-3. In addition, a component level pricing breakdown for each category of investment at each respective exchange is attached to my testimony as Exhibit NW-D-4.

The "Line Cards" category includes only the analog POTS line cards that are equipped in the OLB chassis. No other equipment is included in this group.

Next, the "Line Interface Card" category includes equipment in the Media Gateway and OLB terminals. The items included are the circuit interface cards that provide DS-1 GR-303 connectivity between the Media Gateway and the OLB terminal.

Finally, the "Trunk Card" category includes circuit interface cards in the Media Gateway that are used for trunk interfaces. In other words, these circuit cards provide communication from the Media Gateway to the Public Switched Telephone Network (PSTN).

A loading factor is included to each investment category for the respective locations to account for miscellaneous items. Specifically, a 10 percent factor is incorporated in each category to account for installation materials and labor. In addition, a 15 percent factor is included for miscellaneous costs such as taxes and engineering.

Q14. What technology and configuration options were assumed for the Inter-Exchange Transport cost estimates?

A14. With regards to the FLEC engineering model designed for the Beresford Inter-Exchange Transport network, it is assumed that the network would be implemented identically to their current network topology. This is due to the fact that Beresford is a single exchange company. Their only transport requirements assumed for Beresford are to provide the necessary electronics at the Beresford CO to appropriately accommodate the connectivity with the SDN Communications network.

Q15. How were the quantities of circuit interface cards assumed for the FLEC capital investment estimates derived?

A15. The quantities of circuit interface cards assumed in the FLEC engineering design are based upon the existing circuit interfaces at Beresford for the SDN Communications network.

Q16. With regards to the engineering design for the "Inter-Exchange Transport" network for Beresford, what components comprise the various categories (*e.g.* Base Cost, Line Interface, Tributary Interface, etc.) for the FLEC capital investment estimates?

A16. The "Inter-Exchange Transport" electronics assumed for the FLEC engineering design included items that are divided into three (3) primary categories including "Base Cost", "Line Interface", and "Tributary Interface." The items included in the "Base Cost" category are essentially the common hardware and software elements that are required for the system. Specifically, these items include the equipment chassis, cooling fan modules, CPU, Digital Communications Channel (DCC) units, alarm interface units, timing and synchronization modules, STS switch fabric, VT1.5 switch fabric, system software, Element Management System software, and miscellaneous cabling. A diagram depicting this categorization of components is attached to my testimony as Exhibit NW-D-5. In addition, a component level pricing breakdown for each category of investment at each respective exchange is attached to my testimony as Exhibit NW-D-6.

The "Line Interface" cost category includes the existing SONET and DWDM circuit interfaces cards that are necessary to provide the optical line interfaces to adjacent network elements.

Finally, the "Tributary Interface" costs include a variety of circuit interface cards that are required to add and drop traffic at Beresford. These "Tributary Interface" cards assumed for Beresford may include OC-48, DS-3, DS-1, Gigabit Ethernet, and 10/100 BaseT Ethernet circuit interface cards.

A loading factor is included to each investment category for the respective locations to account for miscellaneous items. Specifically, a 10 percent factor is incorporated in each category to account for installation materials and labor. In addition, a 15 percent factor is included for miscellaneous costs such as taxes and engineering.

Q17. What methodology was utilized to determine the total route mile distance for Outside Plant (OSP) fiber optic cable construction between the adjacent locations?

A17. In the development of the FLEC engineering design, it was assumed that the fiber optic transport infrastructure would be implemented to allow for diverse fiber routes from Beresford to the SDN Communications meet points. This design methodology complies with South Dakota Codified Law, Chapter 49-31-60, by enabling switched survivable rings. In addition, diverse fiber optic cable routing is commonly implemented by companies such as Beresford to prevent a single fiber optic cable cut from isolating an exchange from the rest of the network. The design of the fiber optic cable route assumed cable placement that provides for the most probable and efficient route to the SDN Communications meet points. It is assumed that public right-of-way will be used for this fiber optic cable construction. Therefore, the assumed cable route was designed to follow existing roads. The approximate distance for the "Town" construction was summed to provide the total route mile distance between the respective exchanges. A diagram depicting the general fiber optic cable route is attached to my testimony as Exhibit NW-D-7.

Q18. What is considered "Town" construction versus "Rural" construction?

A18. For the purposes of this design, it was assumed that the fiber optic cable would be constructed to the existing central office building in each exchange. Any cable routes that fall within the city limits of a community, or within an area that has a population density consistent with a town environment, were designated as "Town" construction. The routes that fall outside the city limits (or comparable population density) are deemed to be "Rural" construction. For Beresford, all fiber optic cable included in the design is considered "Town" construction. A diagram depicting the separation of town and rural construction, as well as the general components included in each category, is attached to my testimony as Exhibit NW-D-8.

Q19. How was the per-foot rate for the OSP "Town" construction estimates determined?

A19. The OSP "Town" construction per-foot costs were developed by analyzing deployment costs for actual "Town" construction for communities in South Dakota. The costs used to develop the per-foot rate were based upon actual OSP costs for Fiber to the Premises (FTTP) projects in four communities. The communities whose FTTP construction pricing data was utilized include Brandon, Garretson, Site C (South Dakota Company that is not part of this litigation), and Mitchell.

The unit tabulations from the construction for these communities were reviewed, and any units associated with a subscriber drop (connection to a subscriber location) were removed from the calculation. This was done so that only "main-line" cable construction was included in the estimates. The subscriber drop construction costs were removed from the per-foot calculation due to the fact that it is not representative of the OSP town construction required for Inter-Exchange transport.

The total footage for the four communities was summed, along with the total construction cost for the fiber optic cable construction in these communities. The sum of the total construction in these four communities is 1,525,730 feet of construction at a price of $18,203,871.57. The resulting total cost was divided by the total footage to determine the average cost per foot. The outcome was a total cost per foot estimate of $11.93. A loading factor of 15% for engineering and taxes was added to determine the final result of $13.72 per foot for OSP town construction. A detailed pricing breakdown showing the unit quantities and unit costs used to derive the per-foot pricing estimate for town construction is attached to my testimony as Exhibit NW-D-9.

Q20. Does that conclude your testimony?

A20. Yes. However, I wish to reserve the opportunity to supplement this testimony in the future, if necessary.

Exhibit NW-D-1

Résumé

Of Nathan A. Weber

Currently

- I am a registered professional engineer in South Dakota and North Dakota, and I am the Director of Engineering of Vantage Point Solutions.

Education

- Bachelor of Science in Electrical Engineering from the South Dakota State University (2000)

Employment History

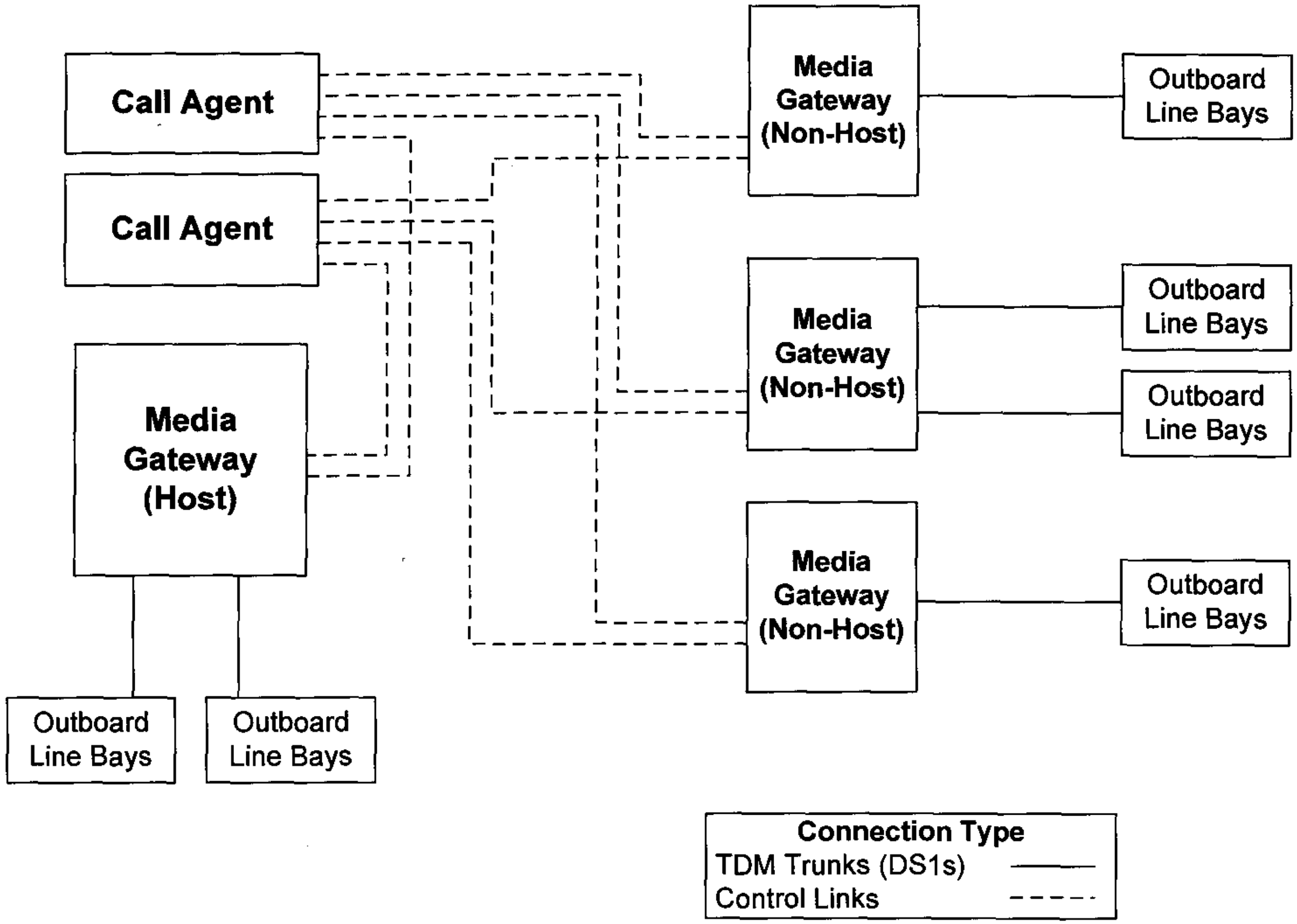
- 2000-2002: Engineering Staff – Martin Group, Inc. (Mitchell, SD)
  - Provided engineering and consulting services to Rural LECs.
- 2002-2006: Senior Engineering Staff – Vantage Point Solutions, Inc. (Mitchell, SD)
  - Provided engineering and consulting services to Rural LECs.
- 2006-Present: Director of Engineering – Vantage Point Solutions, Inc. (Mitchell, SD)
  - Provide engineering, consulting, and regulatory services to rural LECs in South Dakota and elsewhere.

Industry Activities

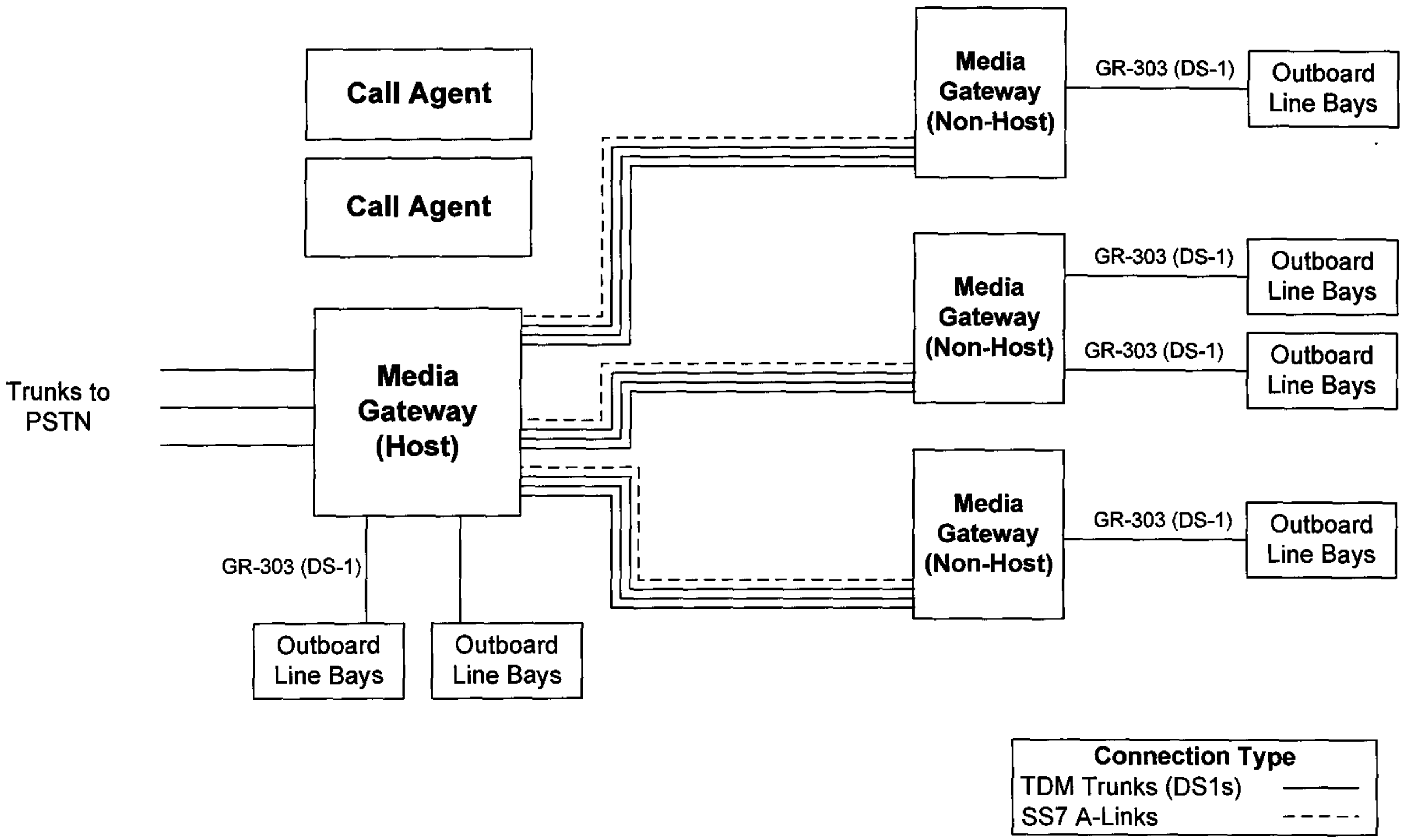
- Frequent speaker at state and national conferences

Softswitch Architecture Diagram

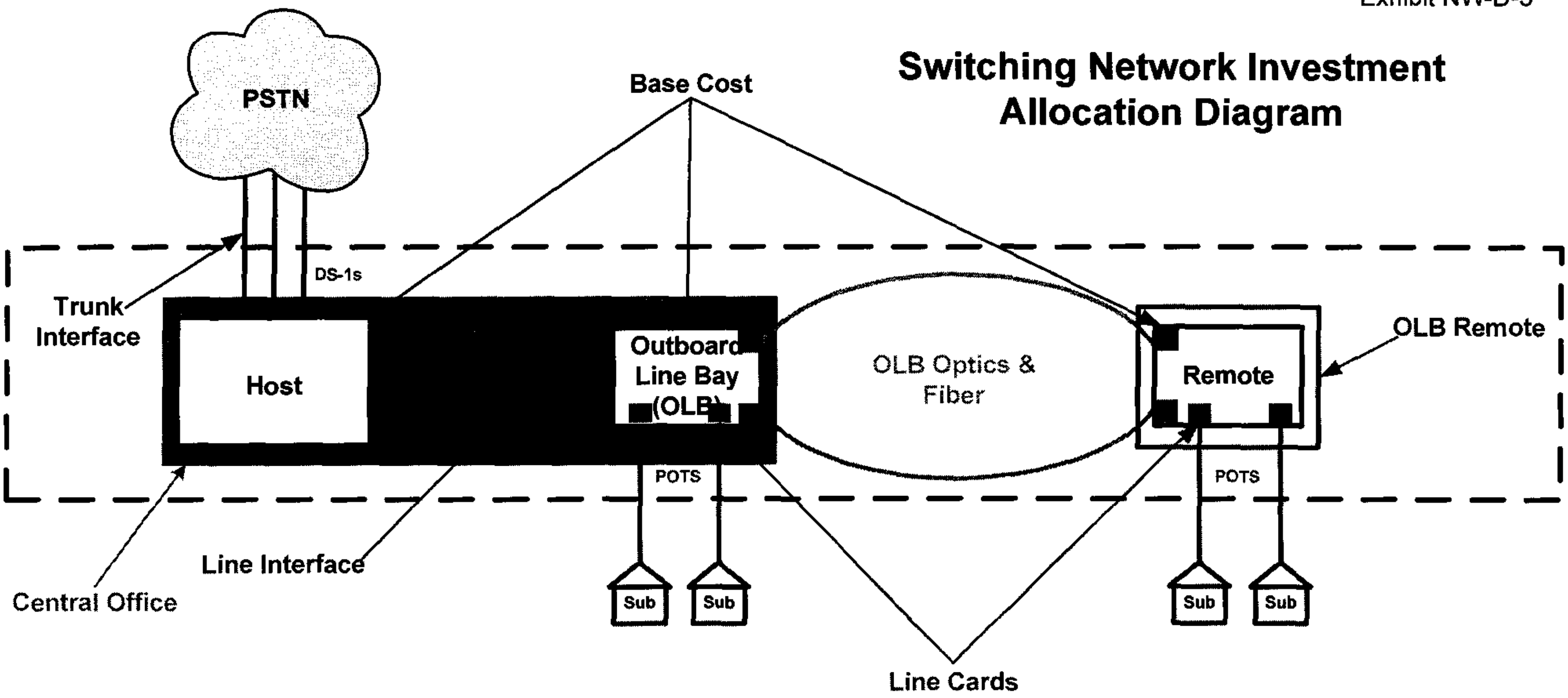
Management / Control Signaling



Softswitch Architecture Diagram
SS7 Signaling / Voice Path



Switching Network Investment Allocation Diagram



Base Cost: Switch Shelf/Commons & OLB Shelf/Commons

Trunk Interface: Switch Trunk Interface Cards

Line Interface: Switch GR-303 Interface Cards & OLB GR-303 Interface Cards

Line Cards: OLB POTS Cards

OLB Fiber: Fiber Optic Cable Serving OLB Remotes

OLB Optics: OC-48 Transport Optics In CO & Remotes

OLB Remote:
Cabinet
Rectifier
Batteries
Misc. Hardware

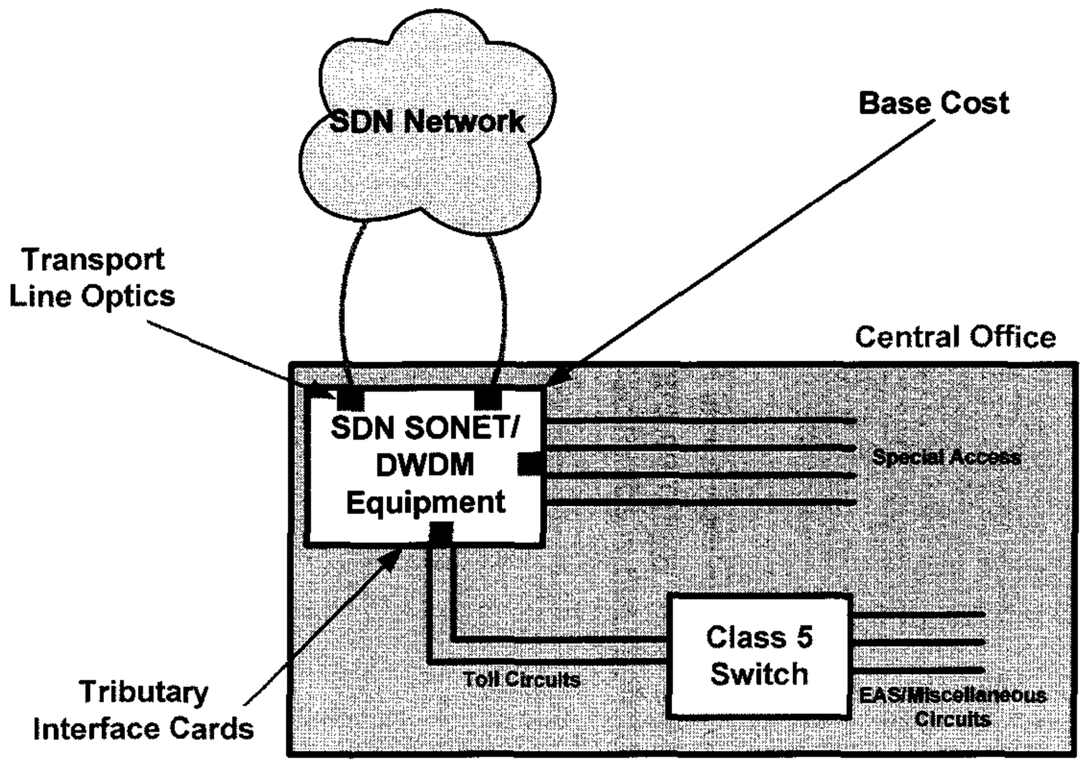
Installation, Engineering, and Taxes

CO Switch Detailed Estimates

Company: Beresford Municipal Telephone Company
Location: Beresford

Category	Description	Quantity	Category Total	Loaded Category Total
Common	Call Agent (CA) - NEBS	2		
Common	3510 Megia Gateway (MG) Chassis including dual redundant CPU units, fans, PSUs, alarms,switches	1		
Common	2510 MG Chassis including dual redundant CPU units, fans, PSUs and alarms	0		
Common	PSTN Signalling Adaptor - 8xT1 + Stratum3 RTM	1		
Common	EMS Server System -non-NEBS, DC	1		
Common	Web Self-Care System - non-NEBS, DC	1		
Common	CA Software, including base Class 5 Features, any access method	1		
Common	MG software	1		
Common	CALEA license per CA	1		
Common	Centrex license per CA	1		
Common	Web Self-Care License per CA	1		
Common	ESA running on a 2510/3510 MG	1		
Common	1000 ESA DNs license	1		
Common	Concurrent Call License	480	$ 288,000.00	$ 364,400.00
Common	Web Self Care user License	480		
Common	Ethernet Interface Card	2		
Common	DLC Chassis including fan tray, fan filter, and cables	4		
Common	DLC Processor	0		
Common	DLC Processor with Integrated OC-3/12 optics	8		
Common	DLC Administration and Maintenance Processor	2		
Common	3510 Spares kit (CPU, Switch, PSU, Alarm, Fan, SG1200)	1		
Common	2510 Spares Kit (CPU, Switch, PSU, Alarm, Fan)	0		
Common	Spare VoIP Adaptor - 3xT3	1		
Common	Spare VoIP Adaptor - 16xT1	0		
Common	Spare Ethernet Interface Card	1		
Common	Spare DLC Processor	1		
Common	Spare DLC Administration and Maintenance Processor	1		
Trunk Interface	Circuit Interface Adaptor - 3xT3	1	$ 16,800.00	$ 21,300.00
Trunk Interface	Circuit Interface Adaptor - 16xT1	0		
Line Interface	Circuit Interface Adaptor - 3xT3	1		
Line Interface	Circuit Interface Adaptor - 16xT1	0	$ 23,400.00	$ 29,700.00
Line Interface	DLC Circuit Interface Adaptor - 6xT1	3		
Line Cards	POTS Card - 24xDS-0	62	$ 99,200.00	$ 125,500.00

Transport Network Investment Allocation Diagram
Beresford Municipal Telephone Company



Base Cost: SONET/DWDM Shelf/Commons

Transport Line Optics: OC-192 Transport, SONET/DWDM Interface to SDN Network

Tributary Interface Cards: DS-1, DS-3, OC-n, Ethernet

Interexchange Fiber: Fiber Optic Cable connecting CO's for transport network

Class 4/5 Switch: See Switch Network Detail Diagram

Note: SDN Terminal Costs were derived from pricing of actual equipment deployed at the respective sites.

OSP Cost Estimate Detail Diagram

Town versus Rural